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IS 11741 (1986): Circular Saws for Wood Working [PGD 32: Cutting tools]



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Indian Standard

SPECIFICATION FOR
CIRCULAR SAWS FOR WOOD WORKING

1. Scope — Covers the dimensions, tooth shape and other requirements of plate type circular saws (for ripping and cross cutting), and certain requirements of single swage saws and double swage saws for wood working.

1.1 Details of saw thickness and tooth shape have not been included for swage saws because of the great number of variations necessary.

2. Types**2.1 Ripping and Cross-Cutting Plate Saws**

a) Ripping plate saw (see Fig. 1A)

b) Cross cut for general purpose and dimensions cutting saw (see Fig. 1B)



FIG. 1A RIPPING PLATE SAW

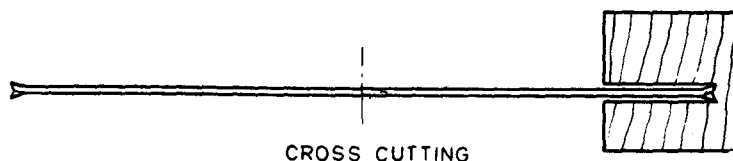


FIG. 1B CROSS-CUTTING SAW

2.2 Single Swage Saws — For cutting boards normally up to 16 mm thick (see Fig. 2).

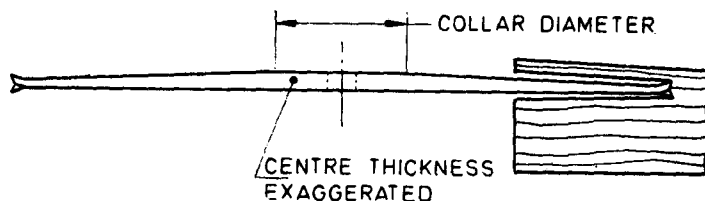


FIG. 2 SINGLE SWAGE SAW (TAPER ONE SIDE ONLY)

2.3 Double Swage Saws — Taper ground both sides for cutting soft wood up to 40 mm thickness and hard wood up to 32 mm thickness (see Fig. 3).

Adopted 7 July 1986

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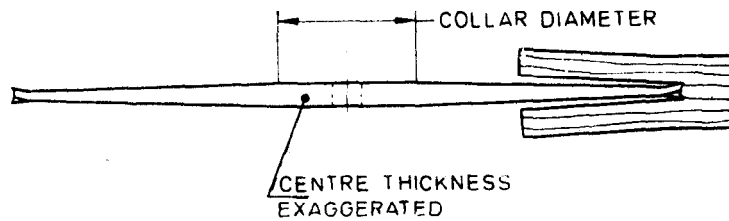


FIG. 3 DOUBLE SWAGE OF TAPER-GROUND SAW (TAPER BOTH SIDES)

3. Nomenclature Relating to Tooth Shape — The nomenclature relating to tooth shape shall be as shown in Fig. 4, 5 and 6.

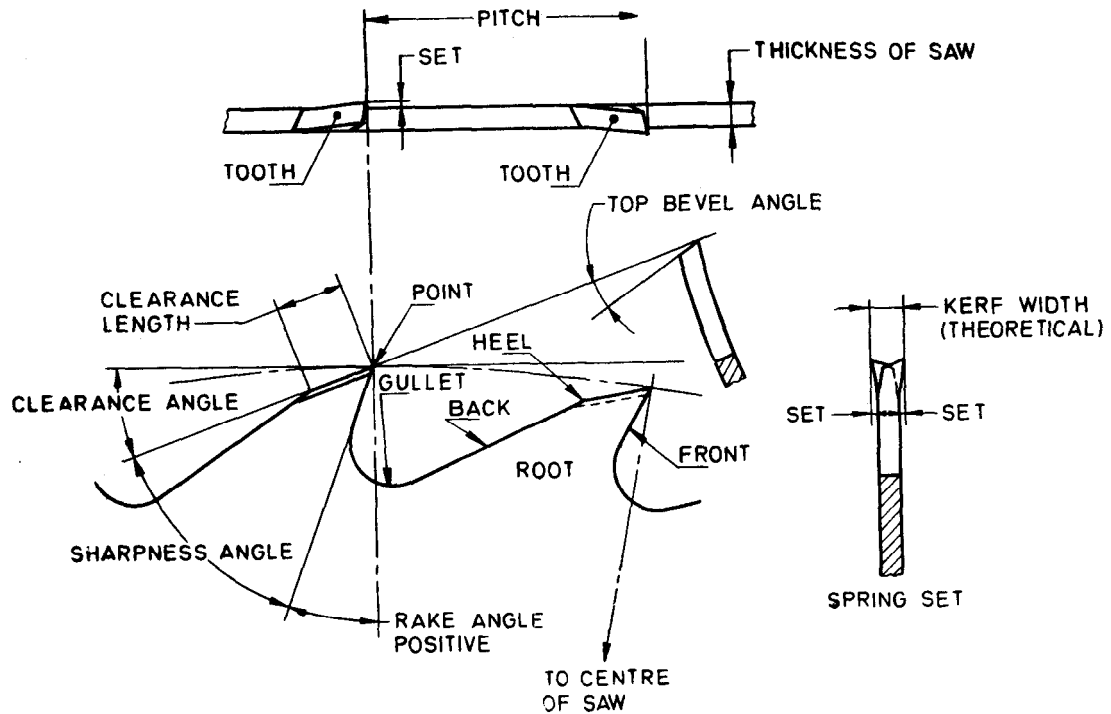


FIG. 4 NOMENCLATURE OF RIP SAW TEETH (SR, HR)

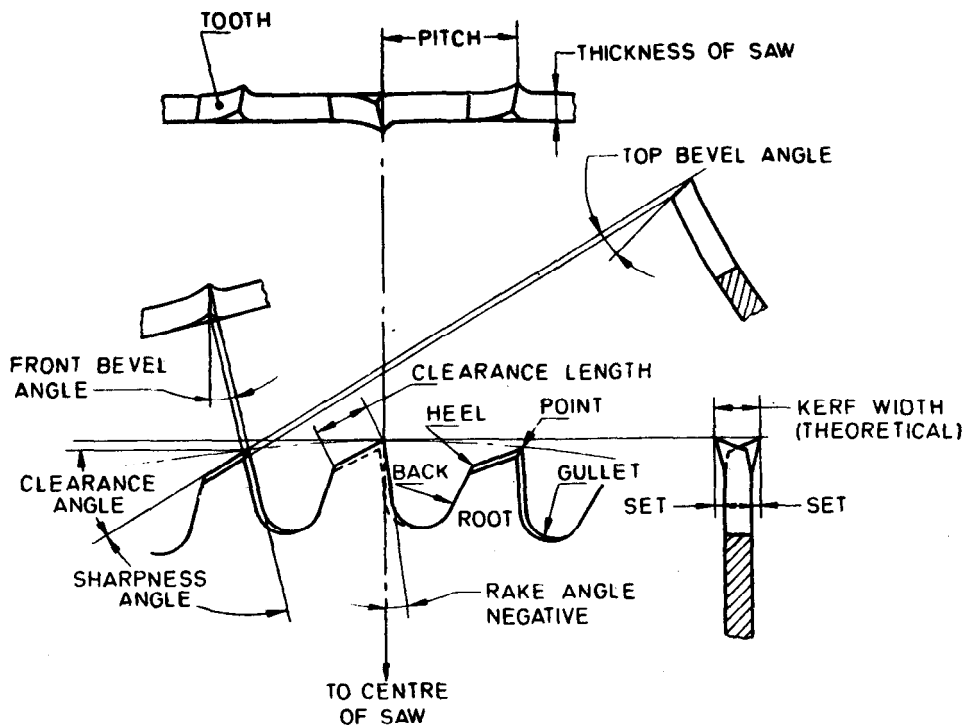


FIG. 5 NOMENCLATURE OF CROSS-CUT TEETH FOR GENERAL PURPOSE CUTTING (GX)

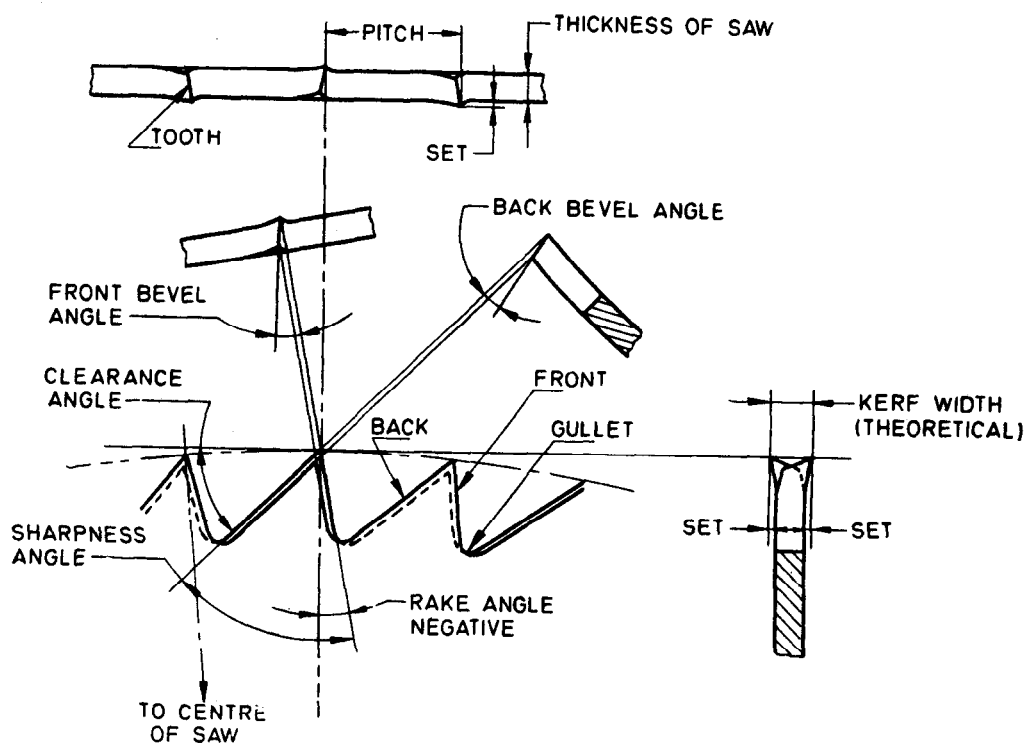


FIG. 6 NOMENCLATURE OF CROSS-CUT TEETH FOR DIMENSION CUTTING (DX)

4. Dimensions

4.1 Ripping and Cross-Cut Saws

All dimensions in millimetres.

Nominal Diameter of Saw	Rip Saw		Cross-Cut Saw	
	Thickness	Tolerance	Thickness	Tolerance
100	0.8	0 -0.05	0.6	0 -0.05
125	0.8		0.9	
160	0.9		1.0	
200	1.0	0 -0.10	1.2	0 -0.10
250	1.2		1.4	
315	1.4		1.6	
355	1.6		2.0	
400	1.6		2.0	
450	2.0		2.5	
500	2.0		2.5	
630	2.5		2.8	
800	2.8		3.0	0 -0.15
1 000	3.0		3.5	

Note — Swage saws shall conform to nominal diameters given above.

4.2 Tolerance on Nominal Diameter of Saw

Nominal Diameter of Saw, mm	Tolerance
Up to 315	± 1.6
Over 315 to 500	± 3.2
Over 500 up to 1 000	± 4.8

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4.3 Saw Drive (Centre Holes, Spindle, Driving, Pin Holes and Pins).

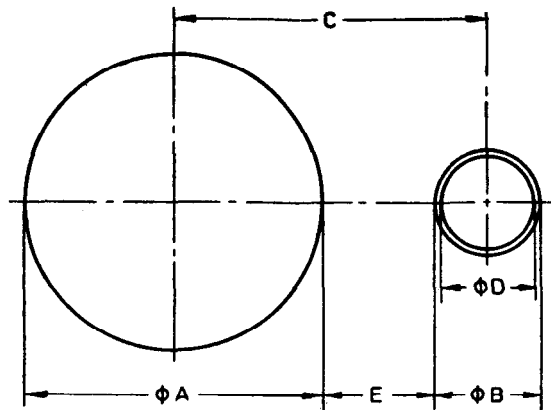
4.3.1 Centre Holes and Spindle — The nominal diameter of the centre holes shall be identical with the nominal diameter of the spindles as given in Table 1.

4.3.2 Driving Pin Holes and Pins — The diameter of the pin and pin holes shall be as given in Table 1.

TABLE 1 DIMENSIONS OF SAW DRIVE

(Clauses 4.3.1 and 4.3.2)

All dimensions in millimetres.



Range of Nominal Diameter of Saw		Nominal Diameter of Centre Hole and Spindle <i>A</i> H9	Diameter of Pin Hole <i>B</i> js 14	Distance Between Centres of Holes <i>C</i> js 14	Diameter of Pin <i>D</i> js 8	Distance Between Edges of Holes <i>E</i>
Over	Up to and including					
100 (Inclusive)	160	20	—	—	—	—
160	250	30	—	—	—	—
250	500	30	14	35	12.5	13
500	1 000	40	14	41.5	12.5	14.5

4.4 Tooth Details — Ripping Saws (SR and HR)

All dimensions in millimetres.

Tooth Shape No.	Density* Range of Wood (kg/m ³)—Seasoned at 12 percent Moisture Content	No. of† Teeth	Clearance Angle	Sharpness Angle	Rake (Hook) Angle	Ratio Gullet Depth to Pitch	Clearance Length	Top Bevel Angle
SR48	Less than 560	48	15°	45°	30°	0.45	0.25 <i>P</i>	15°
HR54	Over 560 to 800	54	15°	55°	20°	0.45	0.30 <i>P</i>	15°
HR60	Over 800 to 1 040	60	15°	60°	15°	0.45	0.30 <i>P</i>	10°
HR80	Over 1 040	80	15°	65°	10°	0.45	0.30 <i>P</i>	5°

* For details of species of wood that falls up to each density range IS : 399-1963 'Classification of commercial timbers and their zonal distribution (revised)'.

† Saws of 355 mm diameter or less shall have 36 teeth.

4.5 Tooth Details — Cross-cut saw for general cutting (GX).

All dimensions in millimetres.

Tooth Shape No.	Range of Nominal Diameter of Saw		No. of Teeth	Clearance Angle	Sharpness Angle	Rake (Hook) Angle	Ratio of Gullet Depth to Pitch	Clearance Length
	Over	Up to and including						
G × 42	—	200	42					
G × 48	200	250	48					
G × 56	250	355	56					
G × 64	355	450	64	25°	70°	5°	0.7	0.37 P
G × 72	450	500	72					
G × 80	500	630	80					
G × 88	630	1 000	88					

4.6 Tooth Details — Cross-cut saw for dimension cutting (DX).

All dimensions in millimetres.

Tooth Shape No	Range of Nominal Diameter of Saw	Number of Teeth	Clearance Angle	Sharpness Angle	Rake (Hook) Angle
D × 84	Up to 250	84	40°	60°	10° (Negative)
D × 128	Over 250 Up to and including 450	128	40°	60°	10° (Negative)

5. Material — Shall be carbon steel of grade 80C6 or 85C6 according to IS : 1570 (Part 2)-1979 Specification for carbon steels (unalloyed steels) (*first revision*) or alloy steel having physical properties equivalent or superior to the carbon steel specified. In case of alloy steel the composition shall be as agreed to between the manufacturer and the purchaser.

6. Hardness — 350 HV Min
485 HV Max

7. Designation

7.1 A ripping plate saw of nominal diameter 800 mm with number of teeth 54 and tooth shape number HR54 conforming to this standard shall be designated as:

Ripping Plate Saw 800 HR 54 IS : 11741

8. General Requirements**8.1 Radial Runout**

8.1.1 Centre to gullet — The radial runout measured at the diameter to the bottom of the gullet, relative to the centre hole, shall be as given below:

Diameters up to 500 mm	0.6 mm
Diameters over 500 mm up to and including 1 000 mm	0.8 mm

8.1.2 Centre to point — The radial runout measured at the diameter to the points of teeth, relative to the centre hole shall be:

Diameters up to 500 mm	0.8 mm
Diameters over 500 mm up to and including 1 000 mm	1.2 mm

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8.2 Axial Runout — When mounted on a spindle and rotated slowly, the variation in reading of a dial indicator gauge applied to the side face, close to the teeth of saw shall not exceed the axial runout values given below:

All dimensions in millimetres.

Range of Nominal Diameter of Saw	Axial Runout	
	Cross Cut Saw	Rip Saw
100 to 250	0.13	0.20
Over 315 up to 450	0.20	0.30
Over 500 up to 630	0.40	0.45
Over 800 up to 1 000	0.50	0.60

8.3 Centre Hole and Spindle — The tolerance on the diameter of centre hole shall be H9 and the tolerance on spindle shall result in a fit H9/g6.

8.4 Tooth Setting — The teeth of the various types of saws shall be set according to the following requirements, in order to provide clearance cutting.

8.4.1 Plate saws

Up to 560 mm diameter,	maximum set	:	0.32 mm
	minimum set	:	0.25 mm
Over 560 mm diameter,	maximum set	:	0.55 mm
	minimum set	:	0.40 mm

8.4.2 Single swage saws

On the flat side,	maximum set	:	0.32 mm
	minimum set	:	0.25 mm
On the taper side,	maximum set	:	0.55 mm
	minimum set	:	0.40 mm

8.4.3 Double swage or taper ground saws

On each side,	maximum set	:	0.32 mm
	minimum set	:	0.25 mm

8.5 Finish — All circular saws shall be supplied set and sharpened, unless otherwise agreed to between the purchaser and the manufacturer.

8.6 Tension — Saws shall normally be tensioned for the following nominal peripheral speeds:

Plate saws	—	50 m/s
Swage saws	—	60 m/s

The rotational speeds of the various sizes of saws necessary to ensure the correct tension are given below:

Nominal Diameter of Saw, mm	Approximate Spindle Speed (rev/min)	
	Plate Saws (Peripheral Speed 50 m/s)	Swage Saws (Peripheral Speeds 60 m/s)
100	9 550	11 460
125	7 640	9 160
160	5 970	7 160
200	4 770	5 730
250	3 820	4 580
315	3 030	3 640
355	2 690	3 228
400	2 390	2 860
450	2 120	2 550
500	1 910	2 290
630	1 520	1 820
800	1 190	1 430
1 000	950	1 140

9. Marking

9.1 The circular saws shall be marked with nominal diameter of saw, tooth shape number and manufacturer's name or trade-mark.

9.2 *Certification Marking* — Details available with the Bureau of Indian Standards.

EXPLANATORY NOTE

In the preparation of this standard considerable assistance has been derived from BS 411 : 1969 Circular saws for wood working and their attachment, issued by the British Standards Institution (BSI) and ISO 2935-1974 'Circular saw blade for wood working — Dimensions', issued by the International Organization for Standardization (ISO).

